WHAT IS CLAIMED IS:

1. A CO sensor which comprises a first measurement space in communication with a measurement gas atmosphere via a first diffusion-controlling section for introducing a gas under measurement into the first measurement space, a second measurement space in communication with the first measurement space via a second diffusion-controlling section, a first electrode disposed in contact with a first proton-conductive layer and located within the first measurement space, a second electrode disposed in contact with the first proton-conductive layer and located outside the first measurement space, a third electrode disposed in contact with a second proton-conductive layer and located within the second measurement space, a fourth electrode disposed in contact with the second proton-conductive layer and located outside the second measurement space, and a support for supporting the first diffusion-controlling section, the first measurement space, the second diffusion-controlling section, the second measurement space, the first proton-conductive layer, the second proton-conductive layer, the first electrode, the second electrode, the third electrode, and the fourth electrode, said CO sensor further comprising:

means for controlling the hydrogen concentration within the first measurement space to a constant level by pumping hydrogen contained in the gas under measurement outside the first measurement space or by pumping

hydrogen into the first measurement space upon application of a first predetermined voltage between the first and second electrodes, and

means for obtaining a CO concentration of the gas under measurement based on current flowing between the third and fourth electrodes upon introduction of the gas under measurement having a controlled hydrogen concentration from the first measurement space to the second measurement space via the second diffusion-controlling section and application of a second predetermined voltage between the third and fourth electrodes.

2. A CO sensor which comprises a first measurement space in communication with a measurement gas atmosphere via a first diffusion-controlling section for introducing a gas under measurement into the first measurement space, a second measurement space in communication with the first measurement space via a second diffusion-controlling section, a first electrode disposed in contact with a first proton-conductive layer and located within the first measurement space, a second electrode disposed in contact with the first proton-conductive layer and located outside the first measurement space, a third electrode disposed in contact with a second proton-conductive layer and located within the second measurement space, a fourth electrode disposed in contact with the second proton-conductive layer and located outside the second measurement space, and a support for supporting the first diffusion-controlling section, the first measurement space, the second diffusion-controlling section, the second measurement space, the

first proton-conductive layer, the second proton-conductive layer, the first electrode, the second electrode, the third electrode, and the fourth electrode, said CO sensor further comprising:

means for controlling the hydrogen concentration within the first measurement space to a constant level by pumping hydrogen contained in the gas under measurement outside the first measurement space or by pumping hydrogen into the first measurement space upon application of a first predetermined voltage between the first and second electrodes, and

means for obtaining a CO concentration of the gas under measurement based on an electromotive force generated between the third and fourth electrodes upon introduction of the gas under measurement having a controlled hydrogen concentration from the first measurement space to the second measurement space via the second diffusion-controlling section.

3. The CO sensor as claimed in claim 1, further comprising a first reference electrode disposed in contact with the first proton-conductive layer and located outside the first and second measurement spaces, said first predetermined voltage applied between the first and second electrodes producing a constant potential difference between the first electrode and the first reference electrode.

4. The CO sensor as claimed in claim 2, further comprising a first reference electrode disposed in contact with the first proton-conductive layer and located outside the first and second measurement spaces, said first

predetermined voltage applied between the first and second electrodes producing a constant potential difference between the first electrode and the first reference electrode.

5. The CO sensor as claimed in claim 3, further comprising a second reference electrode disposed in contact with the second proton-conductive layer and located outside the first and second measurement spaces, said second predetermined voltage applied between the third and fourth electrodes producing a constant potential difference between the third electrode and the second reference electrode.

6. The CO sensor as claimed in claim 1, which comprises means for reacting CO contained in the gas under measurement with a hydrogen-containing substance at the second diffusion-controlling section or the second measurement space to generate hydrogen gas.

7. The CO sensor as claimed in claim 2, which comprises means for reacting CO contained in the gas under measurement with a hydrogen-containing substance at the second diffusion-controlling section or the second measurement space to generate hydrogen gas.

8. The CO sensor as claimed in claim 1, wherein the second diffusion-controlling section comprises a catalyst for reacting CO contained in the gas under measurement with a hydrogen-containing substance to generate hydrogen gas.

9. The CO sensor as claimed in claim 2, wherein the second diffusion-controlling section comprises a catalyst for reacting CO contained in the gas under measurement with a hydrogen-containing substance to generate hydrogen gas.

10. The CO sensor as claimed in claim 8, further comprising a heater for heating the catalyst.

11. The CO sensor as claimed in claim 9, further comprising a heater for heating the catalyst.

12. The CO sensor as claimed in claim 1, further comprising a heater for heating the third electrode.

13. The CO sensor as claimed in claim 2, further comprising a heater for heating the third electrode.

14. The CO sensor as claimed in claim 1, wherein hydrogen within the first measurement space is dissociated, decomposed or reacted with another element to generate protons, and the thus-generated protons are transported between the first and second electrodes via the first proton-conductive layer such that the hydrogen concentration within the first measurement space is controlled to a constant level.

15. The CO sensor as claimed in claim 2, wherein hydrogen within the first measurement space is dissociated, decomposed or reacted with

another element to generate protons, and the thus-generated protons are transported between the first and second electrodes via the first proton-conductive layer such that the hydrogen concentration within the first measurement space is controlled to a constant level.

16. The CO sensor as claimed in claim 1, wherein hydrogen within the second measurement space is decomposed or dissociated to thereby generate protons by application of said second predetermined voltage between the third and fourth electrodes, and the thus-generated protons are transported through the second proton-conductive layer to establish a limiting proton current flowing between the third and fourth electrodes.

17. A CO sensor for measuring CO concentration of a gas to be measured containing CO and hydrogen, which comprises:

means for adjusting the hydrogen concentration of the gas to be measured to a constant value,

means for reacting CO contained in the adjusted gas with a hydrogen-containing substance to thereby generate hydrogen gas,

means for decomposing or dissociating the hydrogen gas produced by reaction of CO with the hydrogen-containing substance to thereby generate protons,

means for transporting the protons thus generated through a proton-conductive layer, and

means for obtaining the CO concentration of the gas under measurement by measuring a limiting proton current flowing through the proton-conductive layer.

18. A CO-concentration measurement method which comprises:

introducing a gas under measurement into a first measurement space via a first diffusion-controlling section, and controlling hydrogen concentration in the first measurement chamber to a constant level by pumping hydrogen contained in the gas under measurement outside the first measurement space or pumping hydrogen into the first measurement space;

introducing into a second diffusion-controlling section the gas under measurement present in the first measurement space having a controlled hydrogen concentration,

reacting CO contained in the gas under measurement with a hydrogen-containing substance at the second diffusion-controlling section to thereby generate hydrogen;

introducing into a second measurement space the gas under measurement present in the second diffusion-controlling section and containing the generated hydrogen; and

obtaining a CO concentration of the gas under measurement based on a concentration or amount of hydrogen in the second measurement space.

19. A CO-concentration measurement method which comprises:

introducing a gas under measurement into a first measurement space via a first diffusion-controlling section, and controlling hydrogen concentration in the first measurement chamber to a constant level by pumping hydrogen contained in the gas under measurement outside the first measurement space or pumping hydrogen into the first measurement space;

introducing into a second measurement space, via a second diffusion-controlling section, the gas under measurement present in the first measurement space having a controlled hydrogen concentration;

reacting CO contained in the gas under measurement with a hydrogen-containing substance at the second measurement space to thereby generate hydrogen;

obtaining a CO concentration of the gas under measurement based on a concentration or amount of hydrogen in the second measurement space.

20. A CO-concentration measurement method which comprises:

providing a CO sensor which comprises a first measurement space in communication with a measurement gas atmosphere via a first diffusion-controlling section, a second measurement space in communication with the first measurement space via a second diffusion-controlling section, a first electrode disposed in contact with a first proton-conductive layer and located within the first measurement space, a second electrode disposed in contact with the first proton-conductive layer and located outside the first measurement space, a third electrode disposed in contact with a second

proton-conductive layer and located within the second measurement space, a fourth electrode disposed in contact with the second proton-conductive layer and located outside the second measurement space, and a support for supporting the first diffusion-controlling section, the first measurement space, the second diffusion-controlling section, the second measurement space, the first proton-conductive layer, the second proton-conductive layer, the first electrode, the second electrode, the third electrode, and the fourth electrode,

introducing a gas under measurement into the first measurement space via the first diffusion-controlling section,

applying a first predetermined voltage between the first and second electrodes so as to control the hydrogen concentration within the first measurement space to a constant level by pumping hydrogen contained in the gas under measurement outside the first measurement space or by pumping hydrogen into the first measurement space,

introducing the gas under measurement having a controlled hydrogen concentration from the first measurement space to the second measurement space via the second diffusion-controlling section,

reacting CO contained in the gas under measurement with a hydrogen-containing substance at the second diffusion-controlling section or at the second measurement space to thereby generate hydrogen,

decomposing or dissociating the hydrogen gas produced by reaction of CO with the hydrogen-containing substance to thereby generate protons,

applying a second predetermined voltage between the third and fourth electrodes so as to transport the protons thus generated through the second proton-conductive layer, and

measuring a limiting proton current flowing through the second proton-conductive layer to obtain the CO concentration of the gas under measurement.

21. A CO-concentration measurement method which comprises:

providing a CO sensor which comprises a first measurement space in communication with a measurement gas atmosphere via a first diffusion-controlling section, a second measurement space in communication with the first measurement space via a second diffusion-controlling section, a first electrode disposed in contact with a first proton-conductive layer and located within the first measurement space, a second electrode disposed in contact with the first proton-conductive layer and located outside the first measurement space, a third electrode disposed in contact with a second proton-conductive layer and located within the second measurement space, a fourth electrode disposed in contact with the second proton-conductive layer and located outside the second measurement space, and a support for supporting the first diffusion-controlling section, the first measurement space, the second diffusion-controlling section, the second measurement space, the first proton-conductive layer, the second proton-conductive layer, the first electrode, the second electrode, the third electrode, and the fourth electrode,

introducing a gas under measurement into the first measurement space via the first diffusion-controlling section,

applying a first predetermined voltage between the first and second electrodes so as to control the hydrogen concentration within the first measurement space to a constant level by pumping hydrogen contained in the gas under measurement outside the first measurement space or by pumping hydrogen into the first measurement space,

introducing the gas under measurement having a controlled hydrogen concentration from the first measurement space to the second measurement space via the second diffusion-controlling section,

reacting CO contained in the gas under measurement with a hydrogen-containing substance at the second diffusion-controlling section or at the second measurement space to thereby generate hydrogen,

measuring electromotive force generated between the third and fourth electrodes to obtain the CO concentration of the gas under measurement.